PCAN-USB Pro

High-speed USB 2.0 to CAN/LIN Interface

User Manual v2.1.4

PEAK System

Products taken into account

Product Name	Model	Part number
PCAN-USB Pro		IPEH-002061

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1 Introduction

The PCAN-USB Pro adapter enables simple connection of a PC to CAN and LIN networks. Two field busses can be connected at the same time, with up to four connections available using appropriate adapter cables (2x CAN, 2x LIN). Its robust aluminium casing makes the PCAN-USB Pro adapter suitable for mobile applications. Software interfaces exist for different operating systems, so programs can easily access a connected CAN and/or LIN bus.

Tip: At the end of this manual (Appendix C) you can find a **Quick Reference** with brief information about the installation and operation of the PCAN-USB Pro adapter.

1.1 Properties at a Glance

- Adapter for USB port (USB 2.0)
- Transmitting and receiving of CAN and LIN messages using 2 D-Sub connections (both with pin assignment for CAN and LIN bus)
- Time stamp resolution 1 µs
- Extended operating temperature range -40 - 85 °C (-40 - 185 °F)

CAN operation properties

- Bit rates up to 1 Mbit/s
- Fulfils CAN specification 2.0A and 2.0B
- MAX3057ASA CAN transceiver
- Each CAN channel is separately opto-decoupled against USB and LIN

- Measurements of bus load including error frames and overload frames
- Induced error generation for incoming and outgoing CAN messages

LIN operation properties

- Bit rates of 1 - 20 kbit/s
- AMIS-30600 LIN transceiver
- Both LIN channels (common Ground) are opto-decoupled against USB and CAN
- Can be used as a LIN master or slave (1 ms master task resolution)
- Automatic bit rate, frame length, and checksum type recognition
- Autonomous scheduler with support for unconditional, event frames, and sporadic frames
- Hardware can work through a schedule table (up to 8 tables can be configured with a total of 256 slots

1.2 System Requirements

- Operating system Windows 7/Vista/XP (32/64-bit) or Linux (32/64-bit)
- A vacant USB port (USB 2.0 recommended) at the computer or at a USB hub connected to the computer
- For LIN operation: supply voltage 8 to 18 V for the LIN transceiver (e.g. car battery)

Note: Do not use a USB extension cable to connect the PCAN-USB Pro adapter to the computer. The use of an extension cable does not comply with the USB specification and can lead to malfunction of the adapter.

1.3 Scope of Supply

- PCAN-USB Pro in aluminum casing
- CAN interface drivers for Windows 7/Vista/XP and Linux (32/64 bit)
- LIN interface drivers for Windows 7/Vista/XP (32/64 bit)
- PCAN-View CAN monitor for Windows
- PLIN-View Pro LIN monitor for Windows
- PCAN-Basic programming interface consisting of an interface DLL, examples, and header files for all common programming languages
- PLIN-API programming interface consisting of an interface DLL, an example, and header files for all common programming languages
- Manual in PDF format

Note: Since the application possibilities of the PCAN-USB Pro adapter are various, special cable adapters for connecting the CAN and LIN busses are not provided. Therefore you need a 9-pin D-Sub female connector for your appliances to be connected individually.

2 Installing the Software and the Adapter

This chapter covers the software setup for the PCAN-USB Pro adapter under Windows and the connection of the adapter to a computer.

Setup the drivers before connecting the PCAN-USB Pro adapter to the computer for the first time.

Do the following to install the drivers:

1. Make sure that you are logged in as user with administrator privileges (not needed for normal use of the PCAN-USB Pro adapter later on).
2. Insert the supplied DVD into the appropriate drive of the computer. Usually a navigation program appears a few moments later. If not, start the file `Intro.exe` from the root directory of the DVD.
3. On the page **English > Drivers** activate the entry **PCAN-USB Pro**.
4. Click on **Install now**. The setup program for the driver is executed.
5. Follow the instructions of the setup program.

Tip: If you don't want to install the CAN monitor PCAN-View for Windows onto the hard disk together with the driver, you have the option to start the program later directly from DVD without prior installation.

Do the following to connect the PCAN-USB Pro adapter to the computer and complete the initialization:

Note: Do not use a USB extension cable to connect the PCAN-USB Pro adapter to the computer. The use of an extension cable does not comply with the USB specification and can lead to malfunction of the adapter.

1. Connect the PCAN-USB Pro adapter to a USB port at the computer. The computer can remain powered on.

   Windows notifies that new hardware has been detected.

6. Windows XP only: A Wizard dialog boxes appears for the installation of the drivers (devices “PCAN-USB-PRO-CAN Device” and “PCAN-USB-PRO-LIN Device”). Follow its instructions. Deny the search for driver software at Windows Update and select the automatic software installation during this procedure.

   All Windows operating systems: The drivers are found and installed by Windows.

7. Afterwards you can work as user with restricted rights again.

After a successful initialization of the drivers for the CAN and the LIN bus the LEDs on the PCAN-USB Pro are green.

3 Connecting the CAN and LIN Bus

Both D-Sub connectors on the PCAN-USB Pro adapter are each used for connecting one CAN and one LIN bus. The pin assignment is identical for both D-Sub connectors.

Note: Since the application possibilities of the PCAN-USB Pro adapter are various, special cable adapters for connecting the CAN and LIN busses are not provided. Therefore you need a 9-pin D-Sub female connector for your appliances to be connected individually.

3.1 D-Sub Connector CAN

Two High-speed CAN busses (ISO 11898-2) can be connected, one to each D-Sub connector. The pin assignment for CAN corresponds to the specification CiA® 102.

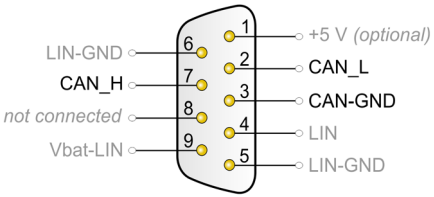

Figure 1: CAN pin assignment of the D-Sub connector

Each CAN connection separately has a **galvanic isolation** up to 500 V against USB and LIN.

Tip: You can connect a CAN bus with a different transmission standard via a bus converter. PEAK-System offers different bus converter modules (e.g. PCAN-TJA1054 for a Low-speed CAN bus according to ISO 11898-3).

3.2 D-Sub Connector LIN

Two LIN busses can be connected, one to each D-Sub connector.

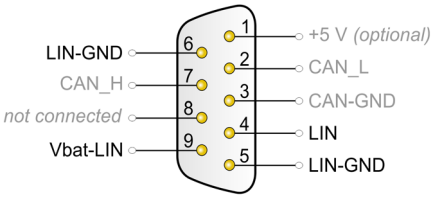

Figure 2: LIN pin assignment of the D-Sub connector

For the LIN operation an additional supply voltage must be applied to pin **Vbat-LIN** (8 - 18 V DC, e.g. car battery). Both LIN connections need their own supply.

Both LIN connections have a common **galvanic isolation** up to 500 V against USB and CAN. The LIN connections are not galvanically isolated against each other.

3.3 Supplying External Devices via the D-Sub Connector

On the PCB of the PCAN-USB Pro adapter (casing opened) a 5-Volt supply can optionally be routed to pin 1 of each D-Sub connector. At delivery this pin is not assigned.

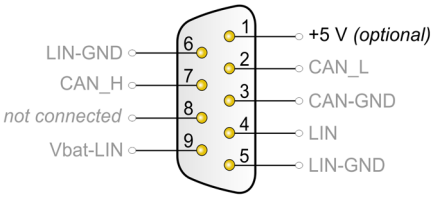

Figure 3: External 5-Volt supply at the D-Sub connectors

When using this option the 5-Volt supply is connected to the power supply of the computer and is not fused separately. A DC/DC converter is interconnected. Therefore the current output is limited to 50 mA.

Tip: On request we deliver the device configured with this option.

Proceed as follows to activate the 5-Volt supply:

Remove the three screws at the back of the aluminum casing, take off the cover plate and pull the PCB out of the lower part of the casing.

Set the solder bridge(s) on the PCB of the PCAN-USB Pro adapter according to the desired function. During this procedure take especially care not to produce unwanted short circuits on the board.

The following figure shows the positions of the solder fields on the PCB of the PCAN-USB Pro adapter; the table below contains the possible settings.

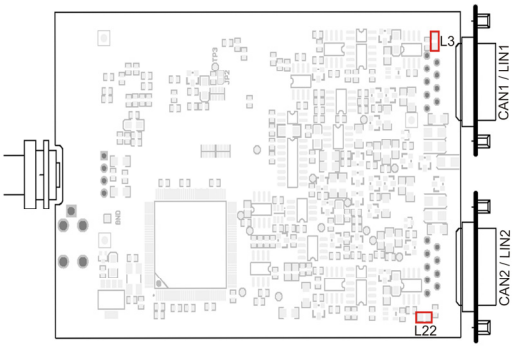

Figure 4: Positions of the solder fields L3 and L22
on the bottom side of the PCB of the PCAN-USB Pro adapter

5-Volt supply →	None	Pin 1
CAN1, solder field L3		
CAN2, solder field L22		

Attention! Risk of short circuit! If the option described in this section is activated, you may only connect or disconnect CAN cables or peripheral systems (e.g. external bus converters) to or from the PCAN-USB Pro while it is de-energized (the PCAN-USB Pro adapter is not connected to the computer). Consider that some computers still supply the USB ports with power even when they are turned off (standby operation).

3.4 Cabling

3.4.1 Termination

A High-speed CAN bus (ISO 11898-2) must be terminated on both ends with 120 Ohms. Otherwise, there are interfering signal reflections and the transceivers of the connected CAN nodes (CAN interface, control device) will not work.

The PCAN-USB Pro adapter does not have an internal termination. Use the adapter on a terminated CAN bus.

3.4.2 Example of a Connection

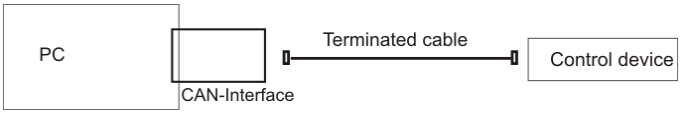

Figure 5: Simple CAN connection

In this example, the PCAN-USB Pro adapter is connected with a control unit by a cable that is terminated at both ends.

3.4.3 Maximum Bus Length

High-Speed-CAN networks may have bit rates of up to 1 Mbit/s. The maximum bus length depends primarily on the bit rate.

The following table shows the maximum possible CAN bus length at different bit rates:

Bit rate	Bus length
1 Mbit/s	40 m
500 kbit/s	110 m
250 kbit/s	240 m
125 kbit/s	500 m
50 kbit/s	1.3 km
20 kbit/s	3.3 km
10 kbit/s	6.6 km
5 kbit/s	13.0 km

The listed values have been calculated on the basis of an idealized system and can differ from reality.

4 Operation

4.1 Status LEDs

For indication of operating conditions the PCAN-USB Pro adapter has several LEDs.

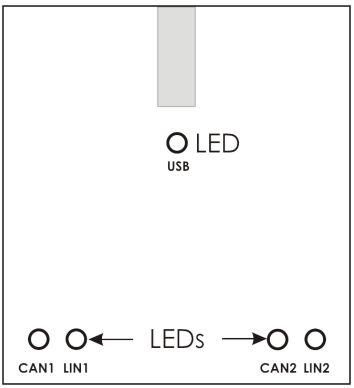

Figure 6: Layout of the LEDs on the casing

LED	Status	Meaning
USB	Green on	A High-speed USB connection (USB 2.0) with a computer is established.
	Green blinking	Communication is occurring on the High-speed USB connection (USB 2.0).
	Orange on	A Full-speed USB connection (USB 1.1) with a computer is established.
		The PCAN-USB Pro adapter is in suspend mode (only voltage supply via USB cable, e.g. during computer standby).
	Orange blinking	Communication is occurring on the Full-speed USB connection (USB 1.1).

LED	Status	Meaning
CAN1/2	Green on	The CAN interface is initialized. There's a connection to a driver of the operating system.
	Green slow blinking	A software application is connected to the CAN interface.
	Green quick blinking	Data is transmitted via the connected CAN bus.
	Red quick blinking	An error is occurring during the transmission of CAN data, e.g. OVERRUN or BUSHEAVY.
LIN1/2	Green on	There's a connection to a driver of the operating system.
	Green slow blinking	The LIN interface is initialized with a valid bit rate. A software application is connected to the LIN interface.
	Green quick blinking	Data is transmitted via the connected LIN bus.

4.2 Unplugging the USB Connection

Under Windows the icon for removing hardware safely is not used with the PCAN-USB Pro adapter. You may unplug the adapter from the computer without any preparation.

4.3 Distinguishing Several PCAN-USB Pro Adapters

You can operate several PCAN-USB Pro adapters on a single computer at the same time. The supplied program PCAN-View allows the assignment of device IDs in order to distinguish the adapters in a software environment. Fore more information see section 5.1.3 Seite 22.

5 Using the Software

This chapter covers the provided software PCAN-View and PLIN-View Pro and the programming interfaces PCAN-Basic and the PLIN-API.

5.1 CAN Monitor PCAN-View for Windows

PCAN-View for Windows is a simple CAN monitor for viewing, transmitting, and logging CAN messages.

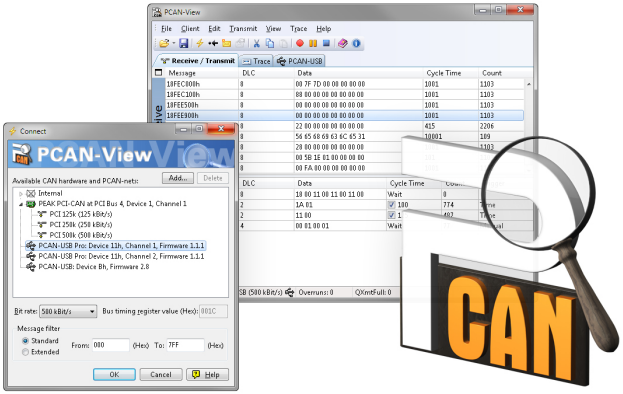

Figure 7: PCAN-View for Windows

Do the following to start and initialize PCAN-View:

1. If PCAN-View is already installed on the hard disk, open the Windows Start menu, go to **All Programs** > **PCAN-USB Pro**, and select the entry **PCAN-View**.

If you haven't installed PCAN-View together with the device driver, you can start the program directly from the supplied DVD. In the navigation program (`Intro.exe`) go to **English** > **Tools**, and under **PCAN-View for Windows** select the link **Start**.

The dialog box for selecting the CAN hardware and for setting the CAN parameters appears.

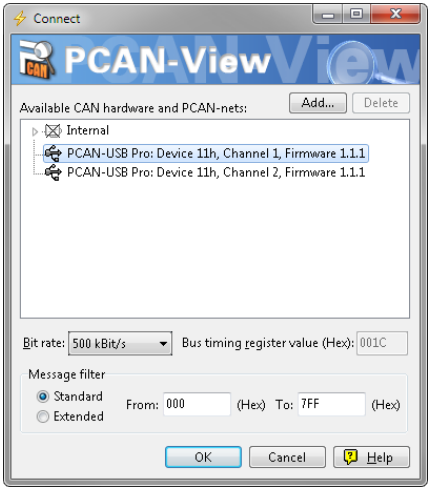

Figure 8: Selection of the CAN specific hardware and parameters

8. From the list **Available CAN hardware** select the CAN channel to be used.
9. Select the bit rate that is used by all nodes on the CAN bus from the dropdown list **Bit rate**.
10. Under **Filter settings** you can limit the range of CAN IDs to be received, either for standard frames (11-bit IDs) or for extended frames (29-bit IDs).
11. Finally confirm the settings in the dialog box with **OK**. The main window of PCAN-View appears (see Figure 9).

5.1.1 Receive/Transmit Tab

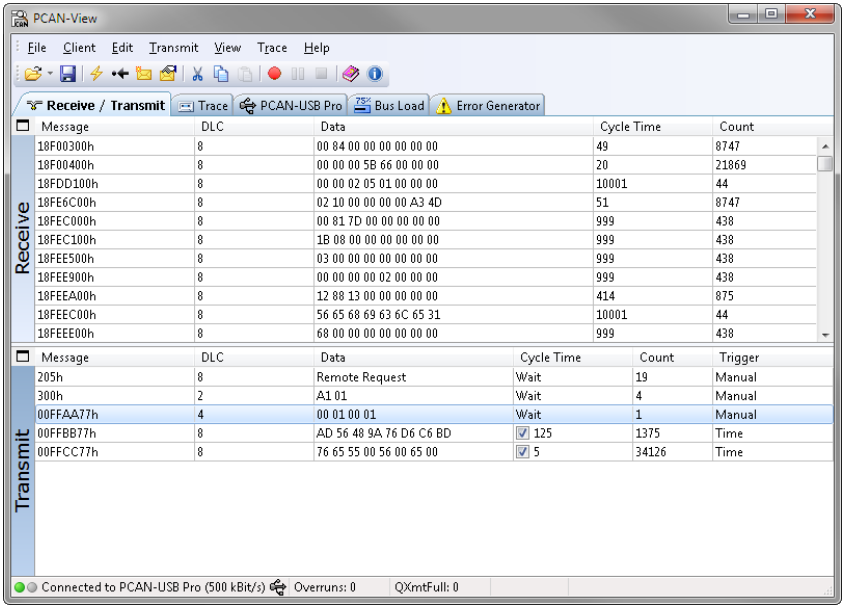

Figure 9: Receive/Transmit tab

The Receive/Transmit tab is the main element of PCAN-View. It contains two lists, one for received messages and one for the transmit messages. Representation of CAN data is in hexadecimal format.

Do the following to transmit a CAN message with PCAN-View:

1. Select the menu command **Transmit** > **New Message** (alternatively or Ins).

   The dialog box **New Transmit Message** is shown.

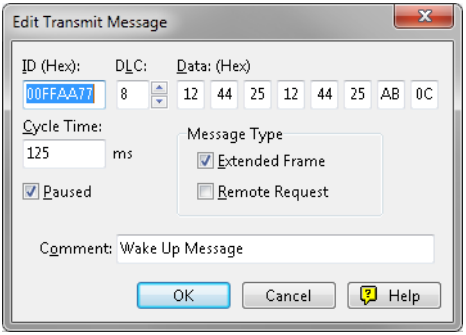

Figure 10: Dialog box New transmit message

12. Enter the ID and the data for the new CAN message.
13. The field **Cycle Time** indicates if the message shall be transmitted manually or periodically. If you want to transmit the message periodically, you must enter a value greater than 0. For a manual-only transmission enter 0.
14. Confirm the entries with **OK**.
15. The created transmit message appears on the **Receive/Transmit** tab.
16. You trigger selected transmit messages manually with the menu command **Transmit** > **Send** (alternatively Space bar). The manual transmission for CAN messages being transmitted periodically is carried out additionally.

Tip: Using the menu command **File** > **Save** the current transmit messages can be saved to a list and loaded for reuse later on.

5.1.2 Trace Tab

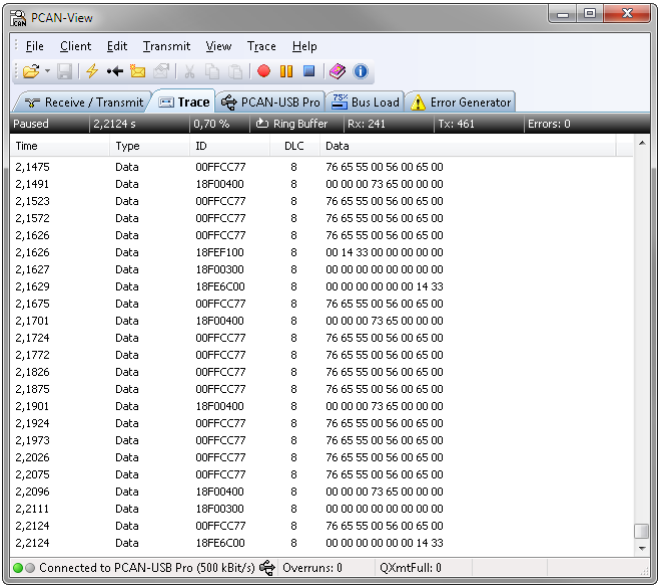

Figure 11: Trace tab

On the Trace tab the data tracer of PCAN-View is used for logging the communication on a CAN bus. During this process the CAN messages are cached in the working memory of the PC. Afterwards they can be saved to a file.

The tracer can be configured to run in linear or in ring buffer mode. In linear buffer mode the logging is stopped as soon as the buffer is filled completely. In ring buffer mode the oldest messages are overwritten by incoming ones.

5.1.3 PCAN-USB Pro Tab

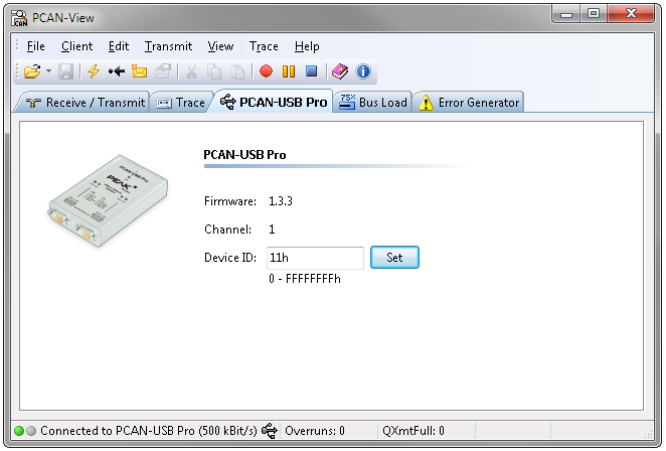

Figure 12: PCAN-USB Pro tab

With the PCAN-USB Pro tab you can assign a device ID to the adapter. Then it can be clearly identified during operation of several PCAN-USB Pro adapters on a single computer.

Furthermore, the current firmware version, and the currently used channel of the connected adapter is displayed on the tab.

5.1.4 Bus Load Tab

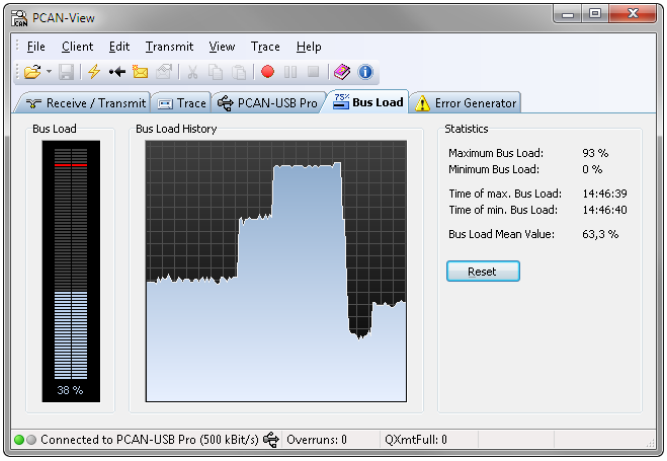

Figure 13: Bus Load tab

On the Bus Load tab the current bus load of the connected CAN channel and its course over time are displayed along with statistical information. The bus load of a CAN bus reflects the utilization of transmission capacity. The more messages are transmitted on the bus, the higher is the bus load.

The current bus load on the connected CAN bus is shown in the bar display **Bus Load** in percent. The course of the bus load over time is displayed in the progress bar **Bus Load History**. In **Statistics**, statistical information are displayed. This data shows the minimum and maximum bus load, and the bus load's arithmetic mean value. With **Reset** you can reset the statistical values.

5.1.5 Error Generator Tab

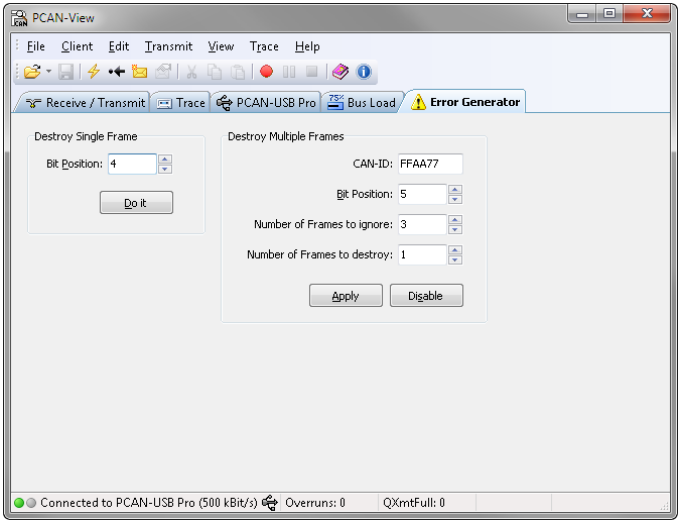

Figure 14: Error Generator tab

The Error Generator tab can be used to generate error frames on the connected CAN bus.

In the area **Destroy Single Frame** you can destroy single CAN frames on the CAN bus.

Do the following to destroy a **Single Frame**:

1. Enter the **Bit-Position** where in a CAN frame the error shall be generated.
17. Execute the destroy action with **Do it**.

    The next received or transmitted CAN frame will be destroyed at the selected bit position.

In the area **Destroy Multiple Frames** you can repeatedly destroy incoming CAN frames that have a certain CAN ID.

Do the following to destroy **Multiple Frames**:

1. Enter the **CAN ID** of the frame to be destroyed.
18. Enter the **Bit-Position** where in the CAN frame the error shall be generated.
19. The field **Number of Frames to ignore** specifies the number of CAN frames that are ignored before a frame is destroyed.
20. The field **Number of Frames to destroy** specifies the number of CAN frames that are destroyed in succession.
21. Confirm the entries with **Apply** to activate the error generator. To disable the error generator press **Disable**.

Note: While the destruction of single CAN frames includes incoming and outgoing messages, the destruction of multiple CAN frames only affects incoming messages.

5.1.6 Status Bar

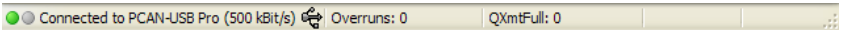

Figure 15: Display of the status bar

The status bar shows information about the current CAN connection, about error counters (Overruns, QXmtFull), and shows error messages.

You can find further information about the use of PCAN-View in the help which you can invoke in the program via the menu **Help** or the F1 key.

5.2 LIN Monitor PLIN-View Pro for Windows

PLIN-View for Windows is a simple LIN monitor for receiving and transmitting LIN messages.

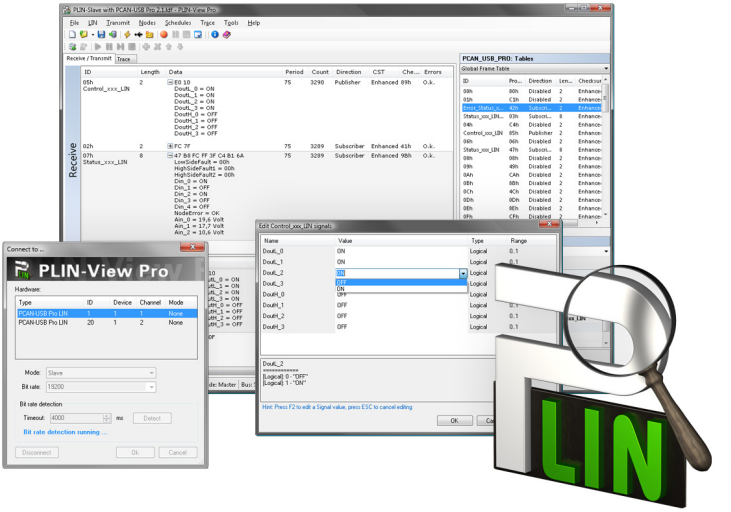

Figure 16: PLIN-View Pro for Windows

Note: PLIN-View Pro is provided exclusively for the use with the PCAN-USB Pro.

Do the following to start and initialize PLIN-View Pro:

1. Start the program PLIN-View Pro from the Windows Start Menu **All Programs** > **PCAN-USB-Pro** and then **PLIN-View Pro**.

   The dialog box for selecting the LIN hardware and for setting the LIN parameters appears.

Figure 17: Selection of the LIN specific hardware and parameters

22. From the **Hardware** list, select the LIN channel to be used.
23. From the dropdown list **Mode**, select the operation mode Master or Slave to be used for the LIN channel.
24. Select the bit rate that is used by all nodes on the LIN bus from the dropdown list **Bit rate**.
25. If you do not know the bit rate for the connected LIN bus, you can automatically detect the used bit rate with the function **Bit rate detection**. In the field **Timeout** you can set the time, to wait for a response from the hardware until the timeout occurs. Confirm with **Detect**.

Note: The LIN channel where the **Bit rate detection** is to be executed must not be initialized (no connection to a software).

If a bit rate was determined successfully, it automatically appears in the dropdown list **Bit rate**.

26. Finally confirm the settings in the dialog box with **OK**. The main window of PLIN-View Pro appears (see Figure 18).

5.2.1 Receive/Transmit or Receive/Publisher Tab

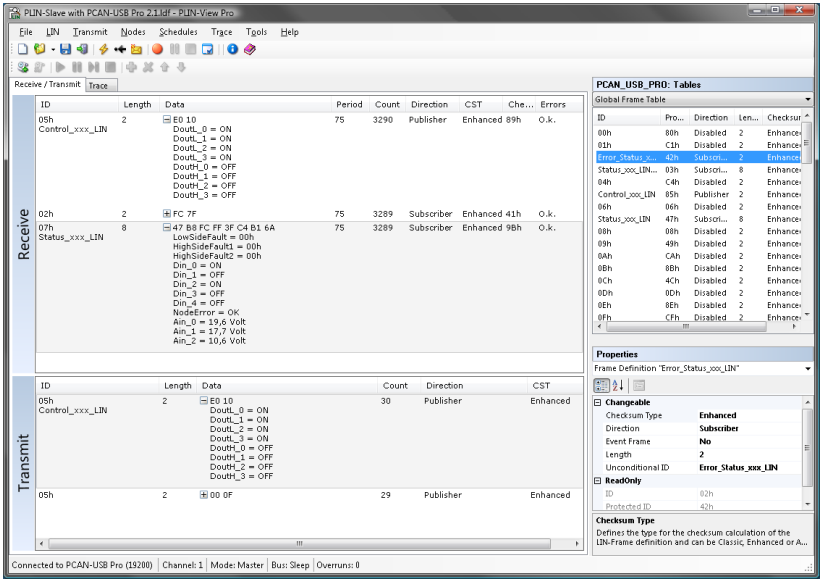

Figure 18: Receive/Transmit tab

The Receive/Transmit or Receive/Publisher tab is the main element of PLIN-View Pro. It contains two lists, one for received and one for transmitted LIN frames. If you are logged in as LIN-Master, the Receive/Transmit tab appears. In Master mode you can transmit frames on the LIN bus. If you are logged in as LIN-Slave, the Receive/Publisher tab appears. In Slave mode you cannot transmit frames. If the Master requests data from a Slave, he can publish it in the LIN frame. In the Global Frame Table all defined LIN frame entries are stored that can be set with the PCAN-USB Pro. To transmit a LIN frame you have to adjust the underlying frame definition in the properties.

Do the following to transmit a LIN frame with PLIN-View Pro:

1. Select a frame from the Global Frame Table.

27. Change the property **Checksum Type** to Enhanced or Classic.
28. Change the property **Direction** in Publisher.
29. Select the menu command **Transmit > New Frame** (alternatively).

    The dialog box **New frame** is shown.

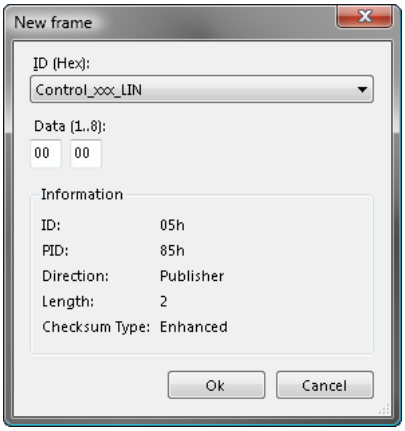

Figure 19: Dialog box New frame

30. Select the frame that should be transmitted from the dropdown list **ID.**
31. Enter in the field **Data** the data for the LIN frame.
32. Confirm the entries with **OK**.
33. Send the selected frame with the menu command **Transmit > Send** (alternatively Space bar).

Note: You can also manage and perform Schedule Tables. Furthermore you can open LDF files and manage Schedule Tables with their information. The Schedule Tables are used to validate or edit data and to present it symbolically.

Tip: You can use PLIN projects to simplify the work with the Global Frame Table, the Transmit or Publisher list, the Schedule tables, and the LDF files. With the menu command **File > Save** all files and configurations are saved in such a project for later use.

5.2.2 Trace Tab

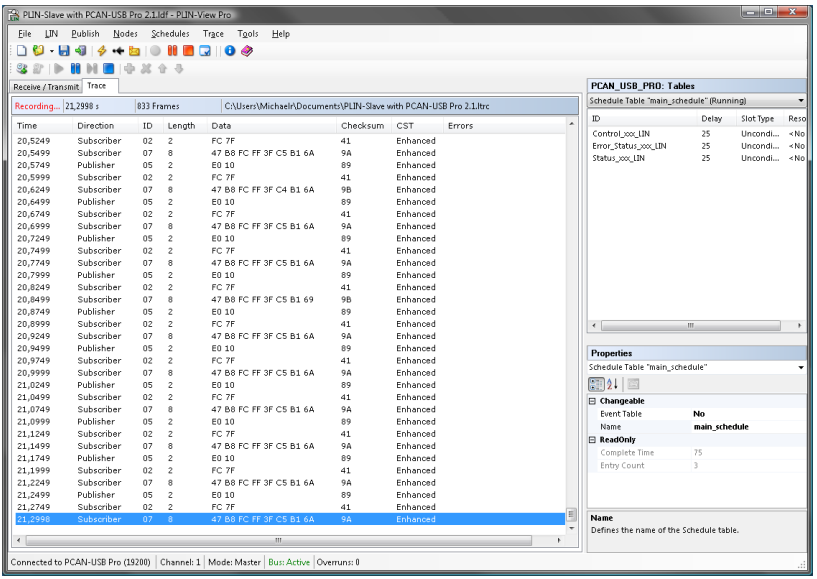

Figure 20: Trace tab

On the Trace tab the data tracer of PLIN-View Pro is used for logging and presenting the communication of a LIN bus.

At the start of the tracer the dialog box **Save** is shown. Enter a filename under which the recording should be stored. The storage of data is done continuously until the tracer is stopped or the storage space on the selected medium is no longer sufficient.

On the upper part of the tracer is a line that issues various information about the tracer status: the current status of the LIN tracer, the complete duration that the tracer is running and recording, the number of recorded LIN frames, and the file name under which the recording will be saved.

5.2.3 Status Bar

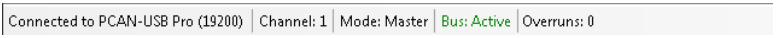

Figure 21: Display of the Status bar

The status bar shows information about the current LIN hardware, the connected LIN channel, the used operation mode, the status of the LIN bus (Active/Sleep), and a counter of not transmitted or received LIN frames (Overruns).

You can find further information about the use of PLIN-View Pro in the help which you can invoke in the program via the menu **Help** or the F1 key.

5.3 Linking Own Programs with PCAN-Basic

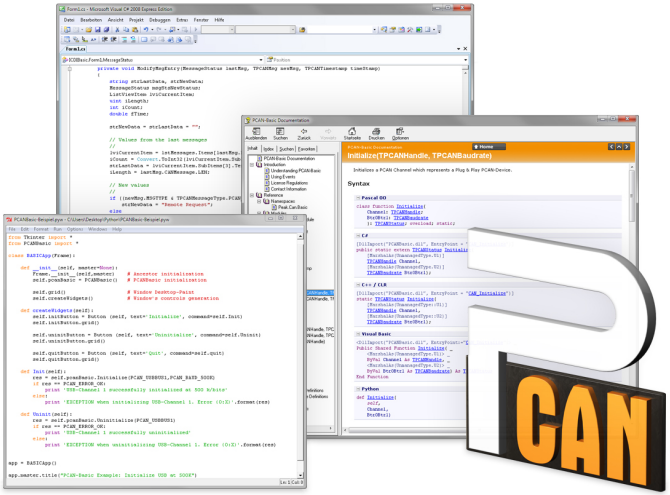

Figure 22: PCAN-Basic

On the provided DVD you can find files of the programming interface PCAN-Basic in the directory branch `Develop`. This API provides basic functions for linking own programs to CAN interfaces by PEAK-System and can be used for the following operating systems:

- Windows 7/Vista/XP (32/64-bit)
- Windows CE 6.x (x86/ARMv4)

The API is designed for cross-platform use. Therefore software projects can easily ported between platforms with low efforts. PEAK-System has created examples for the following programming languages: C++, C#, C++/CLR, Visual Basic, Delphi, Python, and Java.

5.3.1 Features of PCAN-Basic

- Supports Windows 7/Vista/XP (32/64-bit) and Windows CE 6.x operating system
- Multiple PEAK-System applications and your own can be operated on a physical CAN channel at the same time
- Use of a single DLL for all supported hardware types
- Use of up to 8 channels for each hardware unit (depending on the PEAK CAN interface used)
- Simple switching between the channels of a PEAK CAN interface
- Driver-internal buffer for 32,768 messages per CAN channel
- Precision of time stamps on received messages up to 1 µs (depending on the PEAK CAN interface used)
- Access to specific hardware parameters, such as listen-only mode
- Notification of the application through Windows events when a message is received
- Extended system for debugging operations
- Multilingual debugging output
- Output language depends on operating systems
- Debugging information can be defined individually

An overview of the API functions is located in the header files. You can find detailed information about the PCAN-Basic API on the provided DVD in the text and help files (file name extensions `.txt` and `.chm`).

5.3.2 Principle Description of the API

The PCAN-Basic API is the interface between the user application and device driver. In Windows operating systems this is a DLL (Dynamic Link Library).

The sequence of accessing the CAN interface is divided into three phases:

1. Initialization
2. Interaction
3. Completion

Initialization

A CAN channel must be initialized before using it. This is done by the simple call of the function `CAN_Initialize`. Depending on the type of the CAN hardware, up to eight CAN channels can be opened at the same time. After a successful initialization the CAN channel is ready for communication with the CAN hardware and the CAN bus. No further configuration steps are required.

Interaction

For receiving and transmitting CAN messages the functions `CAN_Read` and `CAN_Write` are available. Additional settings can be made, e.g. setting up message filters to confine to specific CAN IDs or setting the CAN controller to listen-only mode.

When receiving CAN messages, events are used for an automatic notification of an application (client). This offers the following advantages:

- The application no longer needs to check for received messages periodically (no polling).
- The response time at reception is reduced.

Completion

To end the communication the function `CAN_Uninitialize` is called in order to release the reserved resources for the CAN channel, among others. In addition the CAN channel is marked as "Free" and is available to other applications.

5.3.3 Notes about the License

Device drivers, the interface DLL, and further files needed for linking are property of the PEAK-System Technik GmbH and may be used only in connection with a hardware component purchased from PEAK-System or one of its partners. If a CAN hardware component of third-party suppliers should be compatible to one of PEAK-System, then you are not allowed to use or to pass on the driver software of PEAK-System.

If a third-party supplier develops software based on the PCAN-Basic and problems occur during the use of this software, consult the software provider.

5.4 Linking Own Programs with the PLIN-API

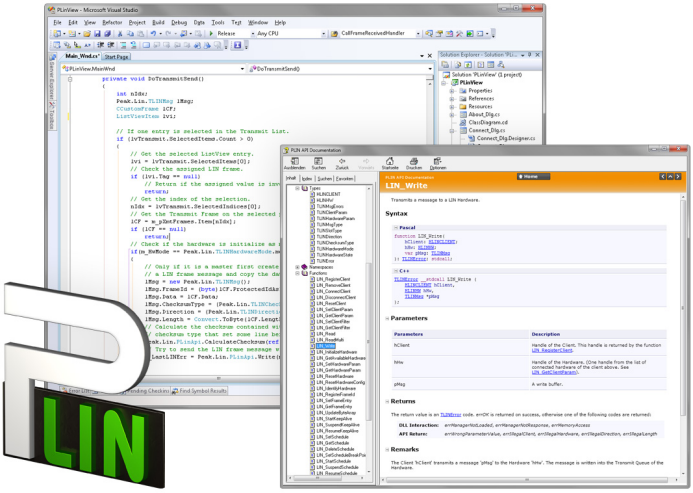

Figure 23: PLIN-API

On the provided DVD you can find files to develop Windows software with an interface to a LIN bus in the directory branch `Develop/PC interfaces/Windows/PLIN-API`.

Note: PLIN-API is provided exclusively for the use with the PCAN-USB Pro.

Furthermore, the DVD contains header files and a programming example for creating own applications in conjunction with the PLIN-API. Read the detailed documentation of the interface (API) in the corresponding header file.

You can find further information in the text and help files (file name extensions `.txt` and `.chm`).

Notes about the License

Device drivers, the PLIN interface DLL, and further files needed for linking are property of the PEAK-System Technik GmbH and may be used only in connection with a hardware component purchased from PEAK-System or one of its partners. If a LIN hardware component of third-party suppliers should be compatible to one of PEAK-System, then you are not allowed to use or to pass on the driver software of PEAK-System.

If a third-party supplier develops software based on the PLIN-API and problems occur during use of this software, consult the software provider.

6 Technical Specifications

Connectors	
USB	USB plug type A USB 2.0 High-Speed and USB 1.1 Full-Speed
CAN/LIN	D-Sub (m), 9 pins Pin assignment according to specification CiA® 102

LIN	
Bit rates	1 kbit/s - 20 kbit/s
Specification	LIN specification 2.1
Timestamp resolution	1 µs
Transceiver	AMIS-30600
Galvanic isolation	Up to 500 V The LIN connections have a common ground.

CAN	
Specification	ISO 11898-2 High-speed CAN (up to 1 Mbit/s) 2.0A (standard format) and 2.0B (extended format)
Timestamp resolution	1 µs
Transceiver	MAX3057ASA
Termination	None
Galvanic isolation	Up to 500 V The CAN connections are isolated separately.
Supplying external devices	D-Sub Pin 1; 5 V, max. 50 mA Not assigned at delivery

Power supply	
Supply voltage	5 V DC via USB port LIN operation: 8 - 18 V DC via D-Sub connector
Power consumption	max. 200 mA at 5 V via USB

Continued on the next page

Environment	
Operating temperature	-40 - 85 °C (-40 - 185 °F)
Temperature for storage and transport	-40 - 100 °C (-40 - 212 °F)
Relative humidity	15 - 90 %, not condensing
EMC	EN 55024:2003-10 EN 55022:2008-05 EC directive 2004/108/EG
Ingress protection (IEC 60529)	IP20

Measures	
Size	71 x 24 x 120 mm (W x H x D) (without connection cable) See also dimension drawings in Appendix B Seite 41
Cable length	ca. 1.5 m
Weight	220 g (with USB cable)

Appendix A CE Certificate

PCAN-USB Pro IPEH-002061 – EC Declaration of Conformity
PEAK-System Technik GmbH

Notes on the CE Symbol CE

The following applies to the PCAN-USB Pro product IPEH-002061

EC Directive

This product fulfills the requirements of EC directive 2004/108/EG on "Electromagnetic Compatibility" and is designed for the following fields of application as per the CE marking:

Electromagnetic Immunity
DIN EN 55024, Publication date: 2003-10
Information technology equipment, immunity characteristics – Limits and methods of measurement (IEC/CISPR 24:1997, modified + A1:2001 + A2:2003);
German version EN 55024:1998 + A1:2001 + A2:2003

Electromagnetic Emission
DIN EN 55022, Publication date: 2008-05
Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement (IEC/CISPR 22:2005, modified + A1:2005);
German version EN 55022:2006 + A1:2007

Declarations of Conformity

In accordance with the above mentioned EU directives, the EC declarations of conformity and the associated documentation are held at the disposal of the competent authorities at the address below:

PEAK-System Technik GmbH
Mr. Wilhelm
Otto-Röhm-Straße 69
64293 Darmstadt
Germany

Phone: +49 (0)6151 8173-20
Fax: +49 (0)6151 8173-29
E-mail: info@peak-system.com

Signed this 4th day of October 2011

Appendix B Dimension Drawings

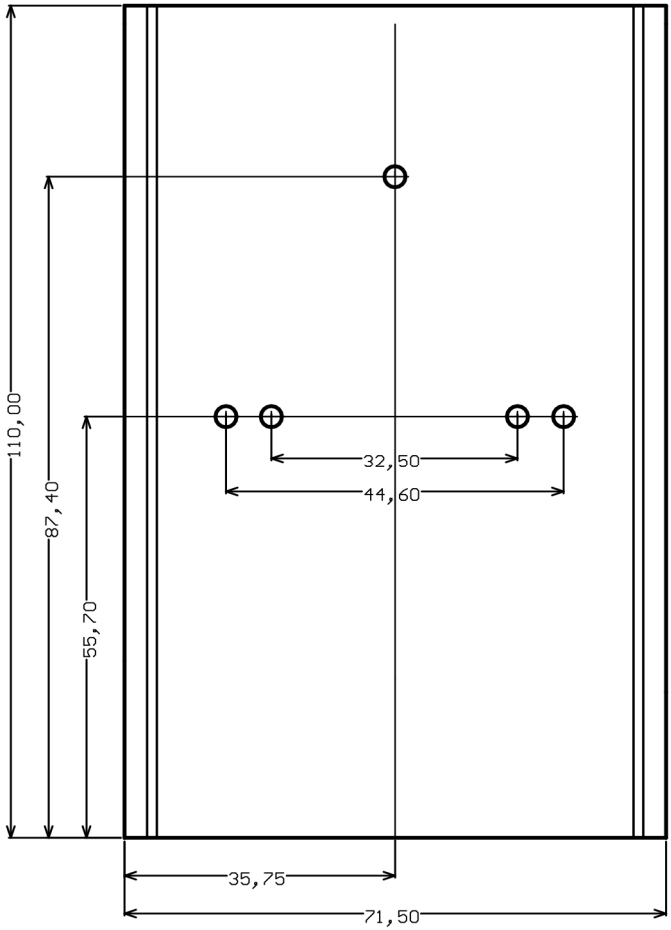

Figure 24: Top view of housing (measures in mm)

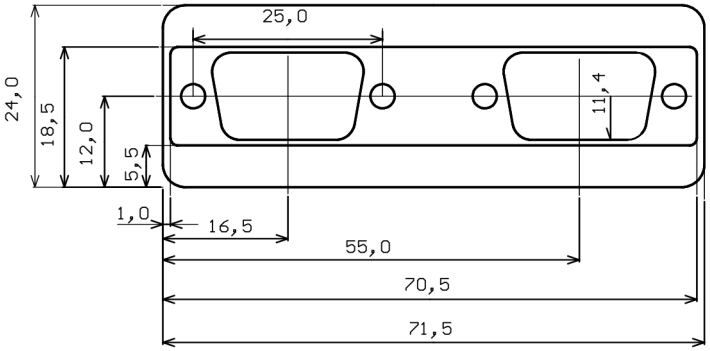

Figure 25: Front view (measures in mm)

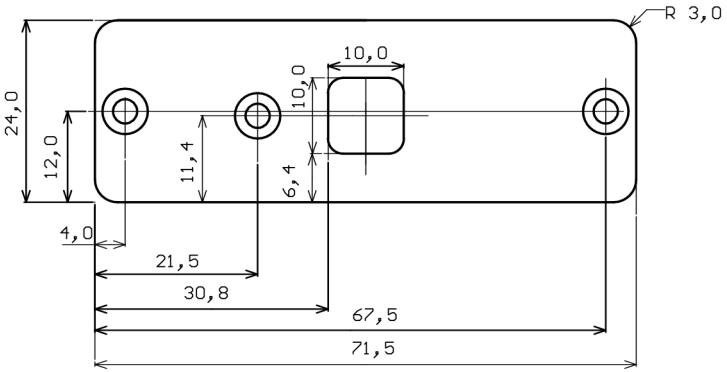

Figure 26: Back view (measures in mm)

Appendix C Quick Reference

Software/Hardware Installation under Windows

Before connecting the PCAN-USB Pro adapter to the computer set up the corresponding software package from the supplied DVD (with administrator privileges). Afterwards connect the PCAN-USB Pro adapter to a USB port at your computer. The adapter is recognized by Windows and the drivers are initialized. After the installation process for the CAN/LIN interfaces is finished successfully the LEDs on the adapter are green.

Getting Started under Windows

Run the CAN monitor PCAN-View or the LIN monitor PLIN-View Pro from the Windows Start menu as sample applications for accessing the PCAN-USB Pro adapter. For initialization of the CAN interface select the CAN channel and the bit rate. For initialization of the LIN interface select the LIN channel, the operation mode (Master or Slave), and the bit rate.

LED	Status	Meaning
USB	Green on	A High-speed USB connection (USB 2.0) with a computer is established.
	Green blinking	Communication is occurring on the High-speed USB connection (USB 2.0).
	Orange on	A Full-speed USB connection (USB 1.1) with a computer is established.
		The PCAN-USB Pro adapter is in suspend mode (only voltage supply via USB cable, e.g. during computer standby).
	Orange blinking	Communication is occurring on the Full-speed USB connection (USB 1.1).

LED	Status	Meaning
CAN1/2	Green on	The CAN interface is initialized. There's a connection to a driver of the operating system.
	Green slow blinking	A software application is connected to the CAN interface.
	Green quick blinking	Data is transmitted via the connected CAN bus.
	Red quick blinking	An error is occurring during the transmission of CAN data, e.g. OVERRUN or BUSHEAVY.
LIN1/2	Green on	There's a connection to a driver of the operating system.
	Green slow blinking	The LIN interface is initialized with a valid bit rate. A software application is connected to the LIN interface.
	Green quick blinking	Data is transmitted via the connected LIN bus.

D-Sub connector (9 pins) for CAN/LIN